the value of his scientific work, all designated him for some superior professorship; so, in 1852, he was elected Professor of Physics at the Polytechnic School. He lectured there with success for twenty-nine years—till 1881, when he resigned.

In 1863 he was appointed Professor at the Sorbonne, where, till his death, he attracted a great number of eager listeners. In this position he displayed his admirable talent of exposition, his great power of simplifying the most difficult questions, and of indicating by most striking apparatus the methods of solving many intricate problems.

The qualifications that Jamin displayed in his oral teaching are found in the "Traité Général de Physique," which reproduces his course at the Polytechnic School, and in which masters as well as pupils find exact descriptions of the actual state of science.

Jamin was not only a physicist; his mind was open to all manifestations of intelligence. At the Normal School, in preparing for his degree in physics, he found time to obtain one in natural sciences also. At Caen he went with his pupils on Sundays on botanical and geological excursions. But it was only on his return to Paris that his great power, elevated ideas, distinguished tastes and his fine intelligence could find a free scope. He remembered always with pleasure how at the age of twenty-five he found himself at once surrounded by an intelligent and enlightened society. He dined in a *pension* with several of his colleagues, who have left names either in science or at the University: with Lefebvre, the eminent professor at the Collège Rollin, with Saisset, Barni, Suchet, La Provostaye; with Faurie, who often brought his friend Sturm. The dinner was followed by long chats, dissertations on science, philosophy, music and art, in which Jamin took an active part. He loved music; he was a painter. He was an early riser, and on Sundays he went with one or two of his colleagues to study the works of the great masters at the Louvre. He painted an admirable portrait of Lefebvre; his family preserve several of his paintings, and the church at Termes possesses a picture of his composition.

But art and literature only occupied his leisure; he produced at that period his most important scientific works—works which procured for him in 1868 admission into the Academy of Sciences.

His researches embrace the most varied subjects. Besides his optical, magnetic, and electrical researches, which remain his best titles to fame, his studies on the compressibility of liquids, on capillarity, hygrometry, specific heats, the critical points of gases, prove the originality and versatility of his genius.

By their historical order and succession his memoirs indicate the progress of physics in France since the middle of the century to the present day. A pupil and admirer of Cauchy, it was by his optical experiments that he made his debut, and it was also to this subject that he most frequently returned.

He took great pains to invent methods of measurement delicate enough to control the analytical results of Cauchy, and his first memoir is a beautiful study of reflection of light by the surfaces of metals. He discovered afterwards the elliptical polarisation of light reflected by vitreous substances near the polarising angle, anticipated by Cauchy's theory; and discovered at the same time the negative elliptical polarisation of fluorine, which no one suspected. He published a long memoir on coloured rings, and invented interference-apparatus utilising the light reflected on opposed faces of thick transparent plates.

When in 1868 M. Durny, then Minister of Public Instruction, founded the École Practique des Hautes Études, and endowed a research laboratory, Jamin profited by the powerful aid thus placed at his disposal. The rapid and so unlooked for progress in electricity supplied a new field for his activity. Assisted at first by inexperienced workers, he thought, and worked for all; he undertook ten different researches, of which one would have absorbed all the time and power of one less indefatigable.

Cruelly touched by family affliction, he found in the midst of his workers, who needed continually his aid and assistance, some relief for his great grief. During some time before his death he seemed to have mastered his sorrows and to have regained his usual activity. He had succeeded his illustrious master, M. Dumas, as Perpetual Secretary of the Academy of Sciences, and no one was more fitted to have filled this delicate office. He had replaced Milne Edwards as Dean of the Faculty of Sciences, and at the time of his death he was at the height of his reputation.

His death leaves a large gap in Parisian scientific society, and those English men of science who had the privilege of knowing him and admiring his genial and powerful nature and his admirable private life will long mourn his loss.

R.

THE U.S. NAVAL OBSERVATORY[1]

In 1880 a site was purchased for a new Naval Observatory a short distance beyond Georgetown, in the district of Columbia; but no appropriation has yet been made for erecting the necessary buildings and removing the instruments from the present location. On account of this delay the Secretary of the Navy, in April 1885, called upon the National Academy of Sciences for an expression of opinion as to the advisability of proceeding promptly with the erection of a new Naval Observatory; and the reply of the Committee of the Academy is contained at length in a letter from the Secretary of the Navy, just published as Executive Document No. 67. The conclusions of the Committee we give in the language of the Report. This Report is signed by F. A. P. Barnard, A. Graham Bell, J. D. Dana, S. P. Langley, Theodore Lyman, E. C. Pickering, C. A. Young. (1) It is advisable to proceed promptly with the erection of a new Observatory upon the site purchased in 1880 for this purpose. (2) It is advisable that the Observatory so erected shall be, and shall be styled, as the present Observatory was styled originally, the "National Observatory of the United States," and that it shall be under civilian administration. (3) It is advisable that the instruments in the present Observatory, with the exception of the 26-inch telescope, the transit circles, and the prime vertical transit, shall be transferred to the Observatory at Annapolis, with such members of the astronomical staff as may be required to operate them; also that such books of the library as relate chiefly to navigation shall take the same destination; the instruments above particularly specified, with the remainder of the library, being reserved as part of the equipment of the new National Observatory, to which also the remaining officers of the astronomical staff shall be assigned for duty. (4) It is advisable that the Observatory at Annapolis shall be enlarged, if necessary, and adapted to subserve as effectually as possible the wants of the Naval Service, whether practical, scientific, or educational; that it shall be under the direction of the department of the Navy, and shall be styled the "Naval Observatory of the United States." The grounds upon which this decision is based are set forth in the document to which we have referred; and numerous letters are appended, from astronomers and others, in regard to the administration of the Observatory, and from physicians of Washington, upon the healthfulness of the portion of the city in which the Observatory is at present situated. It will be seen immediately that this report is intended to favour the establishment of an Observatory worthy of the country, and the

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[1] From *Science*.

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placing its control in the hands of those who have made astronomy their life-work. The Navy will be provided, if the recommendations are carried out, with an Observatory well suited to its special needs, and would be relieved from the task of supervising work in which it has no interest aside from that felt in scientific work in general.

NOTES

WE learn with much regret of the death of Dr. Spencer Cobbold, F.R.S., the well-known authority on parasites and parasitic diseases, at the age of fifty-seven years.

WE understand that it is proposed to award the Founder's Medal of the Royal Geographical Society to Major Greely, the leader of the late United States Arctic Expedition to Grinnell Land, and the Patron's Medal to Cavaliere Guido Cora, Professor of Geography at the University of Turin, and founder and conductor of the geographical journal known as *Cosmos*. The Back Grant will probably go to Sergeant Brainard, who did such admirable work on the Greely Expedition.

MR. J. Y. BUCHANAN, who is in charge of the *Buccaneer*, telegraph surveying ship for the India-rubber Construction Company, writes home from St. Thomas, under date February 1, giving some account of his doings up to that time. When the survey to Loanda was completed, Mr. Buchanan was to be free to take any soundings he pleased and any route he pleased through the Atlantic, so long as he is home by the beginning of April. He has reached Loanda and visited Ascension, and expected to be at the Azores on the 24th. The following was to be Mr. Buchanan's programme after leaving Loanda:—"Stop at 6 a.m. Sound, then take temperatures, water-bottles, tow-net, and possibly dredge. This will take till noon, or perhaps longer; then on again. Next day stop and sound at noon, and take any observations which can be made during the sounding. This may detain us two hours; then on again, and next morning stop at 6 a.m., and make a station again. In this way the time divides itself into periods of 48 hours. Say from 4 p.m., when we set on after finishing a station, we run till 11 a.m. next day; this is 19 hours, or 200 miles; then stop 2 hours; then on again till 6 a.m. of next day, making 17 hours, or 175 miles; then stop till 4 p.m. In this way we get 36 hours' steaming and 12 hours' work in the 48, and cover 375 miles." "We have got very interesting results so far," he goes on, "and a perfect plethora of material. We made a most delightful excursion yesterday," he continues, "to a cinchona plantation up in the high ground in the interior of this island (St. Thomas). They grow very good coffee, and there is no leaf-disease, and they are planting everything up with cacao, which at present prices pays enormously. The island lies only twenty miles north of the equator, and both St. Thomas and Principe are perfect examples of the luxuriance of equatorial vegetation. In Principe the jungle is more dense; in St. Thomas the trees are on a larger scale, and there is magnificent timber. With the exception of Accra and Gaboon, these two islands are the only places where we have landed. All along the so-called *West* Coast the surf is at all times bad and frequently dangerous, so that communication is only kept up by native surf-boats, and Europeans pass through it as rarely as possible. . . . The African rivers are quite stupendous, and have much to do in giving the Gulf of Guinea its peculiar character. The drainage of quite 90 per cent. of the whole continent empties itself into a very restricted area of the sea, the formation and the conditions of which it has profoundly modified."

THE Colonial and Indian Exhibition, which opens in May, besides its wide general interest, will evidently have many points of special interest to men of science. The flora and fauna of almost all the colonies will be represented more or less completely. Thus, Mrs. Blake, the wife of the Governor of the Bahamas, has sent a series of beautiful paintings of the flora of that archipelago for the West Indian section; British Guiana sends specimens of all its woods, to the number of 74. Each block is about 3½ inches wide, 15 inches long, and 3 inches deep. The several pieces are labelled with the colonial name of the wood, its botanical name wherever possible, the height to which the tree grows, and its use. Dr. Schomburgk, the Director of the Botanic Gardens of South Australia, is sending a very comprehensive dried collection of the flora of that colony. It consists of four volumes, and contains 1100 different specimens. A similar collection was sent to the last French Exhibition, and is now in the Paris Herbarium. It is proposed after the Exhibition is over to present this collection to Kew Gardens, or to one of the Universities. Visitors to the South Australian Court will also have an opportunity of examining the magnificent fern-trees of the colony, four of them having been despatched to London for the Exhibition. The trunk of one of these weighed 500 lbs. The Canadian Geological Survey will send a large collection of the minerals of the Dominion; while there will also be collections of Canadian fauna and flora. The animal kingdom of Manitoba and the North-West Territory will be represented with particular care; while the entomological collection will be very comprehensive. Indeed, mineralogy and natural history will form two of the four main departments of the Canadian section. Similarly the mines and the flora of New South Wales will be amply represented. From Victoria comes a large natural history collection, including two young Australian aborigines, and a number of specimens of ferns, which will be arranged in a kind of natural fern-tree gully. The tropical and sub-tropical flora of Queensland will be shown, as will also specimens of the mineral wealth of the colony. From New Zealand comes a large collection of mineralogical and geological specimens, including castings of gigantic fossil reptiles. There will be about 500 specimens of the forest woods of South Africa, and the medical, meteorological, and natural history departments of the Straits Settlements section are receiving special attention from Dr. Rowell. In the West Indian section will be collections o tropical plants from the various islands—pine plants from Antigua, cabbage palms from St. Kitt's, lime-trees from Montserrat, and tree-ferns from Dominica. The process of hatching the ova of turtle will be displayed in this section, which, in addition, will contain a collection of stone implements and relics of the Carib race. There will therefore be no lack in the forthcoming Exhibition of objects deserving of the attention of students in most branches of science.

THE new aquarium which is now being constructed for colonial and Indian fishes, to be shown at the forthcoming Exhibition at South Kensington, is rapidly approaching completion. The building contains twelve tanks in addition to a colossal habitat for turtles, capable of accommodating fifty specimens. In juxtaposition to the latter a hatchery has been erected for incubating the ova of turtle, which will be effected through the medium of heated sand. The hatchery is formed of glass, and contains a grotto arranged in an attractive manner by means of rockwork, over which water will flow into a pool beneath, forming a cascade. The entire aquarium will be heated according to the climatic exigencies of the various fish. Those of India require a temperature of 92°, which is the normal state of their native waters. All the fish will be fresh-water specimens, and on this account great difficulty will attend their transmission to this country. The turtles, however, will be those indigenous to the sea, and comprise chiefly the green turtle (*Chelonia midas*), which will be sent by the West Indian Commissioners in large numbers. The Australian, New Zealand, and Victorian authorities have announced their inability to forward specimens from

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